## We Claim:

511M	h /1	1. A method for assigning codes in a CDMA wireless communication system in
JUIJ	/# <sup>2</sup> /	which a plurality of wireless terminals communicate via a plurality of channels, said
	3	method comprising the steps of:
	4	determining characteristics of said plurality of channels; and
	5	assigning codes to said plurality of wireless terminals based on said
	6	characteristics of said channels.
	1	2. The method of claim 1 wherein said step of assigning codes comprises the
	2	steps of:
	3	choosing a target wireless terminal; and
	4	assigning a code to said target wireless terminal.
ļ	1	3. The method of claim 2 wherein step of assigning a code to a target wireless
	2	terminal comprises the step of:
	3	performing a random code search to obtain an improved code for said target
* <u>.</u>	4	wireless terminal which is an improvement over a current code of said target wireless
1.1 1.1 1.1	5	terminal.
	1	4. The method of claim 3 wherein said step of performing a random code search
	2	comprises the step of randomly searching available codes until an improved code is
	3	found.
	1	5. The method of claim 3 wherein said step of performing a random code search
	2	comprises the step of randomly searching a subset of available codes for the best code in
	3	said subset.
	1	6. The method of claim 3 further comprising the step of:

2	performing a gradient search of codes in the signal space area surrounding said
3	improved code.
1	7. The method of claim 3 further comprising the step of:
2	performing a gradient search of transmission delays for said improved code.
1	8. The method of claim 3 further comprising the steps of:
2	performing a gradient search of codes in the signal space area surrounding said
3	improved code; and
4	performing a gradient search of transmission delays for said improved code.
1	9. The method of claim 1 further comprising the steps of:
2	maintaining a processing set of said plurality of wireless terminals;
3	individually assigning codes to said wireless terminals in said processing set; and
4	adding a wireless terminal to said processing set when said step of individually
5	assigning codes to said wireless terminals in said processing set has converged and
6	repeating said step of individually assigning codes.
1	10. The method of claim 1 further comprising the step of:
2	transmitting said codes to said plurality of wireless terminals.
1	11. A method for assigning a code to a wireless terminal in a CDMA wireless
2	communication system comprising the steps of:
3	determining characteristics of a communication channel of said wireless terminal;
4	and
5	assigning a code to said wireless terminal based on said characteristics of said
6	communication channel.
1	12. The method of claim 11 wherein said step of assigning a code further
2	comprises the step of:
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3	performing a random code search for an improved code relative to a current code
4	assigned to said wireless terminal.
1	13. The method of claim 12 wherein said step of performing a random code
2	search comprises the step of:
3	searching available codes for an improved code.
1	14. The method of claim 12 wherein said step of performing a random code
2	search comprises the step of:
3	searching a subset of available codes for the best code in said subset.
1	15. The method of claim 12 further comprising the step of:
2	performing a gradient search of codes in the signal space area surrounding said
3	improved code.
1	16. The method of claim 12 further comprising the step of:
2	performing a gradient search of transmission delays for said improved code.
1	17. The method of claim 12 further comprising the steps of:
2	performing a gradient search of codes in the signal space area surrounding said
3	improved code; and
4	performing a gradient search of transmission delays for said improved code.
1	18. A method for use in a CDMA wireless communication system comprising the
2	steps of:
3	receiving channel characteristics of a plurality of wireless channels; and
4	assigning codes to a plurality of wireless terminals based on said received channel
5	characteristics.

1	19. The method of claim 18 wherein said step of assigning codes comprises the
2	steps of:
3	choosing a target wireless terminal; and
4	assigning a code to said target wireless terminal.
1	20. The method of claim 19 wherein step of assigning a code to a target wireless
2	terminal comprises the step of:
3	performing a random code search to obtain an improved code for said target
4	wireless terminal which is an improvement over a current code of said target wireless
5	terminal.
1	21. The method of claim 20 wherein said step of performing a random code
2	search comprises the step of randomly searching available codes until an improved code
3	is found.
1	22. The method of claim 20 wherein said step of performing a random code
2	search comprises the step of randomly searching a subset of available codes for the best
3	code in said subset.
1	23. The method of claim 20 further comprising the step of:
2	performing a gradient search of codes in the signal space area surrounding said
3	improved code.
1	24. The method of claim 20 further comprising the step of:
2	performing a gradient search of transmission delays for said improved code.
1	25. The method of claim 20 further comprising the steps of:
2	performing a gradient search of codes in the signal space area surrounding said
3	improved code; and

4	performing a gradient search of transmission delays for said improved code.
1	26. The method of claim 18 further comprising the steps of:
2	maintaining a processing set of said plurality of wireless terminals;
3	individually assigning codes to said wireless terminals in said processing set; and
4	adding a wireless terminal to said processing set when said step of individually
5	assigning codes to said wireless terminals in said processing set has converged and
6	repeating said step of individually assigning dodes.
1	27. The method of claim 18 further comprising the step of:
2	transmitting said codes to said plyrality of wireless terminals.
1	28. Apparatus for communicating with a plurality of wireless terminals via a
2	plurality of channels, said apparatus comprising:
3	a channel estimator for determining channel characteristics; and
4	a code optimizer for assigning codes to said plurality of wireless terminals based
5	on said channel characteristics.
1	29. The apparatus of claim 28 wherein said code optimizer comprises:
2	a memory storing computer program instructions;
3	a processor for executing said stored computer program instructions;
4	said computer program instructions defining the steps of:
5	choosing a target wireless terminal; and
6	assigning a code to said target wireless terminal.
1	30. The apparatus of claim 29 wherein the computer program instructions
2	defining the step of assigning a code to a target wireless terminal further define the step
3	of:
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4	performing a random code search to obtain an improved code for said target
5	wireless terminal which is an improvement over a current code of said target wireless
6	terminal.
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1	31. The apparatus of claim 30 wherein said computer program instructions
2	defining the step of performing a random code search further define the step of randomly
3	searching available codes until an improved code is found.
1	32. The apparatus of claim 30 wherein said computer program instructions
2	defining the step of performing a random code search further define the step of randomly
3	searching a subset of available codes for the best code in said subset.
1	33. The apparatus of claim 30 wherein said computer program instructions
2	further define the step of:
3	performing a gradient search of codes in the signal space area surrounding said
	1
4	improved code.
1	34. The apparatus of claim 30 wherein said computer program instructions
2	further define the step of:
3	performing a gradient search $\phi$ f transmission delays for said improved code.
1	35. The apparatus of claim $\frac{1}{2}$ 0 wherein said computer program instructions
2	further define the steps of:
3	performing a gradient search of codes in the signal space area surrounding said
4	improved code; and
5	performing a gradient search of transmission delays for said improved code.
1	36. The apparatus of claim 28 wherein said computer program instructions
2	further define the steps of:
3	maintaining a processing set of said plurality of wireless terminals;

4	individually assigning codes to said wireless terminals in said processing set; and
5	adding one of said plurality of wireless terminals to said processing set when said
6	step of individually assigning codes to said wireless terminals in said processing set has
7	converged and repeating said step of individually assigning codes.
1	37. The apparatus of claim 28 wherein said computer program instructions
2	further define the step of:
3	transmitting said codes to said plurality of wireless terminals.
1	38. Apparatus for communicating with a plurality of wireless terminals via a
2	plurality of channels, said apparatus comprising:
3	means for determining channel characteristics; and
4	means for assigning codes to said plurality of wireless terminals based on said
5	channel characteristics.
1	39. The apparatus of claim 38 wherein said means for assigning codes comprises
2	means for choosing a target wireless ferminal; and
3	means for assigning a code to said target wireless terminal.
1	40. The apparatus of claim 39 wherein said means for assigning a code to a target
2	wireless terminal comprises:
3	means for performing a random code search to obtain an improved code for said
4	target wireless terminal which is an improvement over a current code of said target
5	wireless terminal.
1	41. The apparatus of claim 40 wherein said means for performing a random code
2	search comprises means for randomly searching available codes until an improved code
3	is found.

1	42. The apparatus of claim 40 wherein said means for performing a random code
2	search comprises means for randomly searching a subset of available codes for the best
3	code in said subset.
1	43. The apparatus of claim 40 further comprising:
2	means for performing a gradient search of codes in the signal space area
3	surrounding said improved code.
1	44. The apparatus of claim 40 further comprising:
2	means for performing a gradient search of transmission delays for said improved
3	code.
1	45. The apparatus of claim 40 further comprising:
2	means for performing a gradient search of codes in the signal space area
3	surrounding said improved code; and
4	means for performing a gradient search of transmission delays for said improved
5	code.
1	46. The apparatus of claim 38 further comprising:
2	means for maintaining a processing set of said plurality of wireless terminals;
3	means for individually assigning codes to said wireless terminals in said
4	processing set;
5	means for adding one of said plurality of wireless terminals to said processing set
6	when said step of individually assigning codes to said wireless terminals in said
7	processing set has converged and repeating said step of individually assigning codes.
1	47. The apparatus of claim 38 further comprising:
2	means for transmitting sald codes to said plurality of wireless terminals.